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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,886	07/14/2006	Armel Le Lievre	PSA0305071	9882

29980 7590 02/19/2010

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EXAMINER	
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ART UNIT	PAPER NUMBER
3749	

MAIL DATE	DELIVERY MODE
02/19/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/553,886	LE LIEVRE, ARMEL	
	Examiner	Art Unit	
	Patrick F. O'Reilly III	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _03 December 2009_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-14_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-9 and 11-14_ is/are rejected.

7)☒ Claim(s) _10_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _21 October 2005_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to applicant's amendment received on December 3, 2009.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Regarding amended claim 5, the phrases "preferably not less than 80°C" and "preferably not below 10°C" render the claim indefinite because it is unclear whether the limitations included in these phrases are part of the claimed invention. See MPEP § 2173.05(d). In general, a claim is rendered indefinite by broad and narrow ranges within the context of the same claim because the use of such ranges prevents one of ordinary skill in the art from ascertaining the scope of the claim. Consequently, for the purpose of an examination on the merits, the examiner has considered claim 5 to require the following: "the exhaust gas is directed towards the heat exchanger without any additional injection of fuel while the cooling fluid is not at a temperature below a temperature lying in the range 70°C to 85°C, and while the outside temperature is not below a temperature lying in the range 5°C to 15°C."

5. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being dependent on rejected base claim 5.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 1, 3, 5, 7, 8, 11, 12, 13, and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent No. EP 0 985 807 A1 ("EP '807") in view of Van Bashuysen (US 4,335,849), and further in view of Carberry et al. (US 2002/0078681 A1). These three references, when considered together, teach all of the elements recited in **claims 1, 3, 5, 7, 8, 11, 12, 13, and 14** of this application, except for certain matters of obvious design choice (claim 12).

8. In particular, claim 1 of this application is obvious when the EP '807 reference is viewed in light of Van Bashuysen, and further viewed in light of Carberry et al. The EP '807 reference discloses the invention substantially as claimed, including: circulating a cooling fluid (coolant) in a circuit (coolant circuit 3) for cooling an engine (M), wherein the circuit (3) comprises an air heater unit (unit heater A, which heats the cabin of the motor vehicle), and a heat exchanger (E) disposed in an exhaust system (2, 4, 5, 6, 7, 15, E) that is also provided with a depollution assembly (e.g., catalyst unit 4), wherein the depollution assembly (4) comprises a catalyst (catalyst unit 4), wherein the heat exchanger (E) is placed in said exhaust system (2, 4, 5, 6, 7, 15, E) downstream from the depollution assembly (4) in the exhaust gas (exhaust fumes G) flow direction, and the exhaust system (2, 4, 5, 6, 7, 15, E) comprises a bypass duct (depicted beneath the heat exchanger E in Fig. 1A) in parallel with the heat exchanger (E), and directing the exhaust gas (G) in the exhaust system (2, 4, 5, 6, 7, 15, E) and downstream from the depollution

assembly (4) towards at least of (i) the heat exchanger (E) and (ii) the bypass duct (as shown in Fig. 1A) by means of exhaust path switching valve (17) as a function of the temperature of the engine cooling fluid (the position of the exhaust path switching valve 17 is controlled by electronic control means in accordance with the coolant temperature, as detected by coolant temperature sensors 19, 20), and of the engine operating conditions (the engine coolant temperature, which is detected by sensors 19, 20, represents an engine operating condition, namely the temperature at which the engine M is operating). Refer to EP '807, Figures 1A-4; also refer to previously provided English abstract and English translation of the Detailed Description for EP '807, page 3 of 7, paragraphs [0017]-[0020]; page 4 of 7, paragraphs [0021]-[0024] and [0027]; and page 5 of 7, paragraph [0040].

However, claim 1 of this application further discloses that the cooling fluid circuit also includes a pump, the depollution assembly also includes a particle filter, and that the exhaust gas is also directed either towards the heat exchanger, or towards the bypass duct, as a function of the outside temperature, and of the heating temperature requested in the cabin. The EP '807 reference does not expressly disclose these additional limitations.

Van Bashuysen, although, teaches a heating system/method for a motor vehicle having a coolant circuit (4, 5) for cooling a diesel engine (1) and including a water pump (6) for circulating the coolant, an air heater unit (heating device 3, which heats the passenger compartment 2 of the motor vehicle), and an exhaust valve device (throttle element 11) that controls the flow of exhaust gas in accordance with the outside temperature, the heating temperature requested in the cabin (passenger compartment 2), the temperature of the engine cooling fluid, and/or the engine load, for the purpose of ensuring adequate heating of the

passenger compartment by regulating the exhaust gas flow in response to measurements indicative of the passenger compartment heating load and heating source availability. See Van Bashuysen, Figures 1-2; column 1, lines 43-63; column 2, lines 38-68; and column 3, lines 1-12. Therefore, when the EP ‘807 reference is viewed in light of Van Bashuysen, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the vehicle cabin heating method of EP ‘807 by providing the coolant circuit (3) with a pump for circulating the coolant therein, and by additionally controlling the position of the exhaust valve (17) in accordance with the outside temperature and the heating temperature requested in the cabin, as taught by Van Bashuysen, in order to ensure adequate heating of the passenger compartment by regulating the exhaust gas flow in response to measurements indicative of the passenger compartment heating load.

Moreover, Carberry et al. teaches a vehicle exhaust gas system/method having a depollution assembly (filter assembly 24) disposed in the exhaust gas discharge pipe (see Fig. 1), wherein the depollution assembly (24) is provided with both an oxidation catalyst (46) and a particle filter (particulate filter 48) that is provided to capture particulate matter, such as carbon particles, in the exhaust gas air stream. Refer to Carberry et al., Figure 1 and page 2, paragraphs [0021]-[0023]. Therefore, when the EP ‘807 reference is viewed in light of Van Bashuysen, and further viewed in light of Carberry et al., it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the vehicle cabin heating method of EP ‘807 in view of Van Bashuysen by adding a particle filter (48) to the depollution assembly (4), as taught by Carberry et al., in order to capture particulate matter, such as carbon particles, in the

exhaust gas air stream prior to its passing through the heat exchanger (E), thereby preventing the heat exchanger (E) from being clogged with particulate matter from the engine (M).

9. In regard to claim 3, Van Bashuysen further teaches that the exhaust valve device (throttle element 11) of the vehicle heating system/method disclosed therein is controlled in accordance with the load (torque) and/or rotational speed of the diesel engine (1) for the purpose of ensuring that the quantity of heat passing into cooling water system is adequate for heating the passenger compartment of the vehicle. See Van Bashuysen, Figures 1-2 and column 1, lines 43-63. Therefore, when the EP ‘807 reference is viewed in light of Van Bashuysen, and further viewed in light of Carberry et al., it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the vehicle cabin heating method of EP ‘807 in view of Van Bashuysen and Carberry et al. by also controlling the position of the exhaust valve (17) in accordance with the load (torque) and/or rotational speed of the engine, as additionally taught by Van Bashuysen, in order to ensure that the quantity of heat passing into cooling water system is adequate for heating the passenger compartment of the vehicle.

10. In regard to claims 5 and 13, Van Bashuysen further teaches that, in the vehicle heating system/method disclosed therein, an increased quantity of fuel is supplied to the cylinders of the engine by the regulator of the injector pump when the cooling water temperature and the outside air temperature are both low, for the purpose of causing a greater quantity of heat to be absorbed by the cooling water, thereby increasing the heating capacity of the system. Refer to Van Bashuysen, Figure 1; column 1, lines 14-18 and 43-63; and column 2, lines 60-67. Conversely, Van Bashuysen suggests that when the cooling water temperature and the outside air temperature are sufficiently high, no additional quantity of fuel is supplied to the cylinders of the engine. See

Van Bashuysen, column 1, lines 14-18 and column 2, lines 60-67. Therefore, when the EP '807 reference is viewed in light of Van Bashuysen, and further viewed in light of Carberry et al., it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the vehicle cabin heating method of EP '807 in view of Van Bashuysen and Carberry et al. by injecting an additional quantity of fuel into the cylinders when the cooling water temperature and the outside air temperature are low, and not supplying any additional fuel to the engine when both temperatures are sufficiently high, as additionally taught by Van Bashuysen, in order to efficiently increase the heating capacity of the system by only supplying additional fuel to the engine when it is actually needed.

The EP '807 reference, as modified by Van Bashuysen and Carberry et al., does not teach specific coolant and outside air temperature ranges for which no additional fuel is injected into the engine. Although, it has been held that "[w]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation". See MPEP § 2144.05(II)(A) (quoting *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). However, it has further been held that "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. Refer to MPEP § 2144.05(II)(B) (quoting *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). In regard to claims 5 and 13 of this application, the prior art, namely the EP '807 reference, discloses that the cooling fluid (coolant) temperature is a variable parameter. Refer to the previously provided English translation of the Detailed Description for EP '807, page 2 of 7, paragraph [0010]. Similarly, the prior art, namely

Van Bashuysen, teaches that the outside air temperature is also variable depending on the weather conditions. See Van Bashuysen, column 1, lines 14-18 and column 3, lines 56-63. Moreover, the cooling fluid (coolant) temperature and the outside air temperature are both result-effective variables because the prior art teaches that the engine operating conditions and the overall capacity of the vehicle heating system are both affected by varying values for the cooling fluid (coolant) temperature and the outside air temperature. Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select a cooling fluid (coolant) temperature range of 70°C to 85°C (or preferably not less than 80°C), and an outside temperature range of 5°C to 15°C (or preferably not below 10°C), for determining when to operate the vehicle heating system without supplying any additional fuel to the engine because the selection of these particular temperature ranges merely constitutes the optimization of design parameters which fails to patentably distinguish claims 5 and 13 in this application over the vehicle cabin heating method of EP '807 in view of Van Bashuysen and Carberry et al.

11. In regard to claims 7 and 14, Van Bashuysen further teaches that, in the vehicle heating system/method disclosed therein, an increased quantity of fuel is supplied to the cylinders of the engine by the regulator of the injector pump when the cooling water temperature and the outside air temperature are both low, for the purpose of causing a greater quantity of heat to be absorbed by the cooling water, thereby increasing the heating capacity of the system. Refer to Van Bashuysen, Figure 1; column 1, lines 14-18 and 43-63; and column 2, lines 60-67. Therefore, when the EP '807 reference is viewed in light of Van Bashuysen, and further viewed in light of Carberry et al., it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the vehicle cabin heating method of EP '807 in view of

Van Bashuysen and Carberry et al. by injecting an additional quantity of fuel into the cylinders when the cooling water temperature and the outside air temperature are low, as additionally taught by Van Bashuysen, in order to cause a greater quantity of heat to be absorbed by the cooling water, thereby increasing the heating capacity of the system. See Van Bashuysen, column 2, lines 64-67.

The EP '807 reference, as modified by Van Bashuysen and Carberry et al., does not teach specific coolant and outside air temperature ranges for when additional fuel is to be injected into the engine. Although, it has been held that "[w]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation". See MPEP § 2144.05(II)(A) (quoting *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). However, it has further been held that "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. Refer to MPEP § 2144.05(II)(B) (quoting *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). In regard to claims 7 and 14 of this application, the prior art, namely the EP '807 reference, discloses that the cooling fluid (coolant) temperature is a variable parameter. Refer to the previously provided English translation of the Detailed Description for EP '807, page 2 of 7, paragraph [0010]. Similarly, the prior art, namely Van Bashuysen, teaches that the outside air temperature is also variable depending on the weather conditions. See Van Bashuysen, column 1, lines 14-18 and column 3, lines 56-63. Moreover, the cooling fluid (coolant) temperature and the outside air temperature are both result-effective variables because the prior art teaches that the engine operating conditions and the

overall capacity of the vehicle heating system are both affected by varying values for the cooling fluid (coolant) temperature and the outside air temperature. Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select a minimum cooling fluid (coolant) temperature range of -5°C to +5°C (and preferably of the order of 0ºC), a maximum cooling fluid (coolant) temperature range of 70°C to 85°C (and preferably of the order of 80ºC), and an outside temperature less than a temperature in the range of 5°C to 15°C (and preferably of the order of 10ºC), for determining when to operate the vehicle heating system while supplying additional fuel to the engine because the selection of these particular temperature ranges merely constitutes the optimization of design parameters which fails to patentably distinguish claims 7 and 14 in this application over the vehicle cabin heating method of EP '807 in view of Van Bashuysen and Carberry et al.

12. Moreover, claim 8 of this application is obvious when the EP '807 reference is viewed in light of Van Bashuysen, and further viewed in light of Carberry et al. The EP '807 reference discloses the invention substantially as claimed, including: a circuit (coolant circuit 3) for circulating a cooling fluid for cooling an engine (M) and including an air heater unit (unit heater A, which heats the cabin of the motor vehicle), and a heat exchanger (E) disposed in an exhaust system (2, 4, 5, 6, 7, 15, E) provided with a depollution assembly (e.g., catalyst unit 4), wherein the depollution assembly (4) comprises a catalyst (catalyst unit 4), wherein the heat exchanger (E) is placed in said exhaust system (2, 4, 5, 6, 7, 15, E) downstream from the depollution assembly (4) in the exhaust gas (exhaust fumes G) flow direction, and the exhaust system (2, 4, 5, 6, 7, 15, E) comprises a bypass duct (depicted beneath the heat exchanger E in Fig. 1A) in parallel with the heat exchanger (E), and a flap (exhaust path switching valve 17) for

directing the exhaust gas (G) towards at least one of (i) the heat exchanger (E) and (ii) the bypass duct (as shown in Fig. 1A), said flap (17) being actuated (by electronic control means) as a function of the temperature of the engine cooling fluid (the position of the exhaust path switching valve 17 is controlled by the electronic control means in accordance with the coolant temperature, as detected by coolant temperature sensors 19, 20), and of the engine operating conditions (the engine coolant temperature, which is detected by sensors 19, 20, represents an engine operating condition, namely the temperature at which the engine M is operating). Refer to EP ‘807, Figures 1A-4; also refer to previously provided English abstract and English translation of the Detailed Description for EP ‘807, page 3 of 7, paragraphs [0017]-[0020]; page 4 of 7, paragraphs [0021]-[0024] and [0027]; and page 5 of 7, paragraph [0040].

However, claim 8 of this application further discloses that the cooling fluid circuit also includes a pump, the depollution assembly also includes a particle filter, and that the flap is also actuated as a function of the outside temperature, and of the heating temperature requested in the cabin. The EP ‘807 reference does not expressly disclose these additional limitations.

Van Bashuysen, although, teaches a heating system/method for a motor vehicle having a coolant circuit (4, 5) for cooling a diesel engine (1) and including a water pump (6) for circulating the coolant, an air heater unit (heating device 3, which heats the passenger compartment 2 of the motor vehicle), and an exhaust valve device (throttle element 11) that controls the flow of exhaust gas in accordance with the outside temperature, the heating temperature requested in the cabin (passenger compartment 2), the temperature of the engine cooling fluid, and/or the engine load, for the purpose of ensuring adequate heating of the passenger compartment by regulating the exhaust gas flow in response to measurements

indicative of the passenger compartment heating load and heating source availability. See Van Bashuysen, Figures 1-2; column 1, lines 43-63; column 2, lines 38-68; and column 3, lines 1-12. Therefore, when the EP '807 reference is viewed in light of Van Bashuysen, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the vehicle cabin heating system of EP '807 by providing the coolant circuit (3) with a pump for circulating the coolant therein, and by additionally controlling the position of the exhaust valve (17) in accordance with the outside temperature and the heating temperature requested in the cabin, as taught by Van Bashuysen, in order to ensure adequate heating of the passenger compartment by regulating the exhaust gas flow in response to measurements indicative of the passenger compartment heating load.

Moreover, Carberry et al. teaches a vehicle exhaust gas system/method having a depollution assembly (filter assembly 24) disposed in the exhaust gas discharge pipe (see Fig. 1), wherein the depollution assembly (24) is provided with both an oxidation catalyst (46) and a particle filter (particulate filter 48) that is provided to capture particulate matter, such as carbon particles, in the exhaust gas air stream. Refer to Carberry et al., Figure 1 and page 2, paragraphs [0021]-[0023]. Therefore, when the EP '807 reference is viewed in light of Van Bashuysen, and further viewed in light of Carberry et al., it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the vehicle cabin heating system of EP '807 in view of Van Bashuysen by adding a particle filter (48) to the depollution assembly (4), as taught by Carberry et al., in order to capture particulate matter, such as carbon particles, in the exhaust gas air stream prior to its passing through the heat exchanger (E), thereby preventing the heat exchanger (E) from being clogged with particulate matter from the engine (M).

13. In regard to claim 11, the EP ‘807 reference further discloses that the flap (exhaust path switching valve 17) can be tilted between a first position (e.g., see Fig. 1B) for closing the bypass duct (depicted beneath the heat exchanger E in Fig. 1B) and a second position (e.g., see Fig. 3) for opening the bypass duct, said tilting between said first and second positions (as depicted Figs. 1B and 3) taking place in the direction in which the exhaust gas (exhaust fumes G) flows along the exhaust system (2, 4, 5, 6, 7, 15, E). Refer to EP ‘807, Figures 1B and 3; also refer to English translation of the Detailed Description for EP ‘807, page 5 of 7, paragraphs [0032]-[0036]; and page 6 of 7, paragraphs [0042]-[0046]. Therefore, the EP ‘807 reference in view of Van Bashuysen, and further in view of Carberry et al., also renders the limitations set forth in this claim obvious.

14. In regard to claim 12, the EP ‘807 reference, as modified by Van Bashuysen and Carberry et al., does not explicitly teach that the flap is disposed downstream from the heat exchanger relative to the gas flow direction in the exhaust system. Although, at the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to either position the flap (exhaust path switching valve 17) upstream from the heat exchanger relative to the gas flow direction in the exhaust system as depicted in Figure 1A of the EP ‘807 reference, or alternatively, to position the flap downstream from the heat exchanger relative to the gas flow direction in the exhaust system as recited in claim 12 of this application, because the applicant has not disclosed that positioning the flap downstream of the heat exchanger provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected the applicant’s invention to perform equally well with the flap (17) located upstream from the heat exchanger

(E), as depicted in the EP ‘807 reference, because this location of the flap relative to the heat exchanger also permits the flap to effectively regulate the flow of exhaust gas between the heat exchanger (E) flow passage and the bypass flow passage. See EP ‘807, Figures 1B and 3.

15. **Claims 2, 4, and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent No. EP 0 985 807 A1 (“EP ‘807”) in view of Van Bashuysen (US 4,335,849) and Carberry et al. (US 2002/0078681 A1) as applied to claim 1 above, and further in view of Nakagawa et al. (US 2003/0136113 A1). These four references, when considered together, teach all of the elements recited in **claims 2, 4, and 6** of this application.

16. In particular, claim 2 of this application is obvious when the EP ‘807 reference is viewed in light of Van Bashuysen and Carberry et al., and further viewed in light of Nakagawa et al. With respect to claim 2, Van Bashuysen further teaches that, in the vehicle heating system/method disclosed therein, an increased quantity of fuel is supplied to the cylinders of the engine by the regulator of the injector pump for the purpose of causing a greater quantity of heat to be absorbed by the cooling water, thereby increasing the heating capacity of the system. Refer to Van Bashuysen, Figure 1; column 1, lines 54-63; and column 2, lines 60-67. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the vehicle cabin heating method of EP ‘807 in view of Van Bashuysen and Carberry et al. by injecting an additional quantity of fuel into the cylinders of the engine so as to give rise to the additional combustion of fuel, as additionally taught by Van Bashuysen, in order to cause a greater quantity of heat to be absorbed by the cooling water, thereby increasing the heating capacity of the system. See Van Bashuysen, column 2, lines 64-67.

The EP '807 reference, as modified by Van Bashuysen and Carberry et al., does not explicitly teach that the additional quantity of fuel is injected into the cylinders of the engine after the main injection of fuel, and during the expansion stage of the cycle, so as to increase the temperature of the gas flowing along the exhaust system and through the heat exchanger. Although, Nakagawa et al. teaches a method for controlling an internal combustion engine wherein an additional quantity of fuel is injected into the cylinders of the engine after the main injection of fuel, and during the expansion stage (stroke) of the cycle, for the purpose of increasing the temperature of the gas flowing along the exhaust system. Refer to Nakagawa et al., page 4, paragraph [0097] and page 9, paragraph [0208]. Therefore, when the EP '807 reference is viewed in light of Van Bashuysen and Carberry et al., and further viewed in light of Nakagawa et al., it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the vehicle cabin heating method of EP '807 in view of Van Bashuysen and Carberry et al. by injecting the additional quantity of fuel into the cylinders of the engine after the main injection of fuel, and during the expansion stage (stroke) of the cycle, as taught by Nakagawa et al., in order to increase the temperature of the gas flowing along the exhaust system and through the heat exchanger, thereby increasing the heating capacity of the system.

17. In regard to claim 4, Van Bashuysen further teaches that, in the vehicle heating system/method disclosed therein, an increased quantity of fuel is supplied to the cylinders of the engine by the regulator of the injector pump when the cooling water temperature and the outside air temperature are both low, for the purpose of causing a greater quantity of heat to be absorbed by the cooling water, thereby increasing the heating capacity of the system. Refer to Van

Bashuysen, Figure 1; column 1, lines 14-18 and 43-63; and column 2, lines 60-67. Conversely, Van Bashuysen suggests that when the cooling water temperature and the outside air temperature are sufficiently high, no additional quantity of fuel is supplied to the cylinders of the engine. See Van Bashuysen, column 1, lines 14-18 and column 2, lines 60-67. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the vehicle cabin heating method of EP '807 in view of Van Bashuysen and Carberry et al. by injecting an additional quantity of fuel into the cylinders when the cooling water temperature and the outside air temperature are low, and not supplying any additional fuel to the engine when both temperatures are sufficiently high, as additionally taught by Van Bashuysen, in order to efficiently increase the heating capacity of the system by only supplying additional fuel to the engine when it is actually needed.

The EP '807 reference, as modified by Van Bashuysen and Carberry et al., does not teach specific engine speed and torque ranges for which no additional fuel is injected into the engine. Although, it has been held that "[w]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation". See MPEP § 2144.05(II)(A) (quoting *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). However, it has further been held that "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. Refer to MPEP § 2144.05(II)(B) (quoting *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). In regard to claim 4 of this application, the prior art, namely Nakagawa et al., teaches that the engine speed (Ne) and the engine torque

(TgTc) are variable parameters. Refer to Nakagawa et al., Figures 17-19. Moreover, the engine speed and the engine torque are both result-effective variables because the prior art teaches that the vehicle operating conditions, such as its speed, acceleration, and heating output, are both affected as a result of varying these two parameters. Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select a maximum engine speed range of 2500 rpm to 3500 rpm, and a maximum engine torque range of 100 Nm to 200 Nm, for determining when to operate the vehicle heating system without supplying any additional fuel to the engine because the selection of these particular engine speed and torque ranges merely constitutes the optimization of design parameters which fails to patentably distinguish claim 4 in this application over the vehicle cabin heating method of EP '807 in view of Van Bashuysen, Carberry et al., and Nakagawa et al.

18. In regard to claim 6, Van Bashuysen further teaches that, in the vehicle heating system/method disclosed therein, an increased quantity of fuel is supplied to the cylinders of the engine by the regulator of the injector pump when the cooling water temperature and the outside air temperature are both low, for the purpose of causing a greater quantity of heat to be absorbed by the cooling water, thereby increasing the heating capacity of the system. Refer to Van Bashuysen, Figure 1; column 1, lines 14-18 and 43-63; and column 2, lines 60-67. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the vehicle cabin heating method of EP '807 in view of Van Bashuysen and Carberry et al. by injecting an additional quantity of fuel into the cylinders when the cooling water temperature and the outside air temperature are low, as additionally taught by Van Bashuysen, in order to cause a greater quantity of heat to be absorbed by the cooling water,

thereby increasing the heating capacity of the system. See Van Bashuysen, column 2, lines 64-67.

The EP '807 reference, as modified by Van Bashuysen and Carberry et al., does not teach engine speed and torque ranges for when additional fuel is to be injected into the engine. Although, it has been held that "[w]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation". See MPEP § 2144.05(II)(A) (quoting *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). However, it has further been held that "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. Refer to MPEP § 2144.05(II)(B) (quoting *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). In regard to claim 6 of this application, the prior art, namely Nakagawa et al., teaches that the engine speed (Ne) and the engine torque (TgTc) are variable parameters. Refer to Nakagawa et al., Figures 17-19. Moreover, the engine speed and the engine torque are both result-effective variables because the prior art teaches that the vehicle operating conditions, such as its speed, acceleration, and heating output, are both affected as a result of varying these two parameters. Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select a maximum engine speed range of 2500 rpm to 3500 rpm, and a predetermined engine torque range between a maximum torque and a minimum torque that are functions of the engine speed, for determining when to operate the vehicle heating system while supplying additional fuel to the engine because the selection of these particular engine speed and torque ranges merely constitutes the

optimization of design parameters which fails to patentably distinguish claim 6 in this application over the vehicle cabin heating method of EP '807 in view of Van Bashuysen, Carberry et al., and Nakagawa et al.

19. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent No. EP 0 985 807 A1 ("EP '807") in view of Van Bashuysen (US 4,335,849) and Carberry et al. (US 2002/0078681 A1) as applied to claim 8 above, and further in view of Burk et al. (US 2001/0013409 A1). These four references, when considered together, teach all of the elements recited in **claim 9** of this application.

20. In particular, claim 9 of this application is obvious when the EP '807 reference is viewed in light of Van Bashuysen and Carberry et al., and further viewed in light of Burk et al. As described above, the EP '807 reference, as modified by Van Bashuysen and Carberry et al., discloses all the elements of base claim 8, the claim upon which this claim depends. Moreover, with respect to claim 9, Van Bashuysen further teaches that the vehicle heating system/method disclosed therein is used in a vehicle having a water-cooled diesel engine. Refer to Van Bashuysen, Figure 1; column 1, lines 14-18; and column 2, lines 38-40. However, claim 9 of this application further discloses that the engine is a direct injection diesel engine. The EP '807 reference, as modified by Van Bashuysen and Carberry et al., does not explicitly disclose this additional limitation. Burk et al., although, teaches a heating system/method for a motor vehicle having a exhaust gas/coolant heat exchanger (16) disposed in an exhaust gas pipe (exhaust gas tract 17) that is connected to a diesel engine with direct injection for the purpose of increasing the overall capacity of the heating system in a low consumption diesel engine. See Burk et al., Figure 1; page 3, paragraphs [0025] and [0039]; and page 4, paragraph [0040]. Therefore, when

the EP '807 reference is viewed in light of Van Bashuysen and Carberry et al., and further viewed in light of Burk et al., it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the vehicle cabin heating system of EP '807 in view of Van Bashuysen and Carberry et al. by using the heating system with an exhaust gas heat exchanger (E) in a vehicle having a direct injection-type diesel engine, as taught by Burk et al., in order to increase the overall capacity of the heating system in a low consumption diesel engine. Refer to Burk et al., page 3, paragraphs [0025].

Allowable Subject Matter

21. **Claim 10** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

22. Applicant's arguments filed December 3, 2009 have been fully considered but they are not persuasive for the reasons set forth below.

Contrary to the Applicants' assertions, one of ordinary skill in the art would <u>clearly</u> have a motivation to provide a particle filter downstream of the catalyst (4) in EP '807, the catalyst (4) being <u>upstream</u> of the heat exchanger (E). Refer to EP '807, Figure 1A. In the above section 103 rejections, the Carberry et al. secondary reference is being relied upon for teaching a particle filter (48) immediately downstream of an oxidation catalyst (46) in a depollution assembly (24). See Carberry et al., Figure 1 and page 2, paragraphs [0021]-[0023]. Carberry et al. also expressly teaches a clear motivation for providing such a particle filter (48) in a depollution

assembly, namely to capture particulate matter, such as carbon particles, in the exhaust gas air stream. Refer to Carberry et al., page 2, paragraph [0023]. Consequently, in light of the teachings of Carberry et al., one of ordinary skill in the art would be motivated to provide a particle filter downstream of the catalyst (4) in EP '807 in order to capture particulate matter in the exhaust gas air stream. In particular, the capturing of this particulate matter upstream of the heat exchanger (E) would advantageously prevent the heat exchanger (E) from being clogged with particulate matter from the engine (M) so that its performance and structural integrity would not deteriorate over time as a result of particle accumulation. Thus, the Examiner respectfully disagrees with the Applicant that one of ordinary skill in the art would only be motivated to provide a particle filter downstream of the catalyst (5) in EP '807. The section 103 rejections provided above have articulated a compelling motivation to provide a particle filter downstream of the catalyst (4) in the vehicle exhaust system of EP '807. Therefore, contrary to the Applicant's allegations, the limitations of independent claims 1 and 8 of this application are clearly rendered obvious by the combined teachings of the EP '807 reference, Van Bashuysen, and Carberry et al.

Moreover, as described in the rejections provided above, the limitations set forth in dependent claim 2 are rendered obvious by the combined teachings of the EP '807 reference, Van Bashuysen, Carberry et al., and Nakagawa et al. In particular, Nakagawa et al. teaches a method for controlling an internal combustion engine wherein an additional quantity of fuel is injected into the cylinders of the engine after the main injection of fuel, and during the expansion stage (stroke) of the cycle, for the purpose of increasing the temperature of the gas flowing along the exhaust system. Refer to Nakagawa et al., page 4, paragraph [0097] and page 9, paragraph

[0208]. In the modified exhaust system of EP '807, the increased temperature of the exhaust gas, which occurs as a result of the additional quantity of fuel being injected into the engine, would advantageously increase the temperature of the exhaust gases at the inlet to the heat exchanger (E). This resultant increase in the temperature of the exhaust gases entering the heat exchanger (E) would, in turn, increase the rate of heat transfer from the exhaust gas stream to the coolant circulated through the heat exchanger (E), thereby enabling more heat to be delivered to the vehicle passenger compartment by means of the unit heater (A), which is fluidly connected to the heat exchanger (E) via the coolant circuit (3). See e.g., Figure 1A of EP '807. Therefore, contrary to the Applicant's allegations, the combined features of claim 2 are obvious in light of the references relied upon above in the section 103 rejections.

Furthermore, Applicant's arguments with respect to dependent claim 10 have been considered but are moot in view of the allowable subject matter listed above.

As to all other dependent claims in this application, because the Applicant relied upon his assertions regarding independent claims 1 and 8 as the basis for patentability, it is not necessary to specifically address any arguments associated with the rejections of these claims.

Conclusion

23. See attached form PTO-892 for additional pertinent prior art, which was not directly relied upon in this action.

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick F. O'Reilly III whose telephone number is (571) 272-3424. The examiner can normally be reached on Monday through Friday, 8:30 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven B. McAllister can be reached on (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Patrick F. O'Reilly III/
Examiner, Art Unit 3749

/Steven B. McAllister/
Supervisory Patent Examiner, Art Unit 3749